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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/814.682

03/31/2004

Wen Lin

LIN 13-38

8308

47396

7590

08/22/2006

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EXAMINER

MALDONADO, JULIO J

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/814,682

Applicant(s)

LIN ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21,23-27 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21, 23-27 and 37-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 21 is objected to because of the following informalities: in claim 1, where applicants recite, "...a buried layer doped located...", change to --a doped buried layer located--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 37 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 37 recites "...a buried layer located over a doped substrate, said buried layer doped throughout with germanium and a p-type dopant...interconnects located within interlevel dielectric layers located over said transistors, which connect said transistors to form an operation integrated circuit". However, there is no support of a "buried layer doped throughout with germanium and a p-type dopant" and "interconnects located within interlevel dielectric" in the drawings and the specification.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 21 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Liaw (U.S. 4,962,051).

Liaw (Fig.1) teach a semiconductor device including a doped buried layer (11) located over a doped substrate (10), said buried layer (11) doped throughout with germanium and boron; and a doped epitaxial layer (14) located over said buried layer (11) (Liaw, column 3, line 50 – column 4, line 68).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw ('051) as applied to claims 21-23 above, and further in view of the following comments.

In reference to claims 24 and 25, Liaw substantially teaches all aspects of the invention but fails to disclose wherein the boron concentration of the co-doped germanium buried layer ranges from about 1×10^{15} atoms/cm³ to about 1×10^{20}

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atoms/cm³, a dopant concentration of the doped substrate ranges from about 1×10^{14} atoms/cm³ to about 1×10^{15} atoms/cm³, and a dopant concentration of the doped epitaxial layer ranges from about 1×10^{14} atoms/cm³ to about 1×10^{15} atoms/cm³.

However, the selection of the selected dope ranges is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species to obtain a desired dopant concentration on the substrate, germanium layer and the epitaxial layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Liaw to arrive at the claimed invention.

In reference to claims 26 and 27, Liaw teach all aspects of the invention but fail to disclose wherein the co-doped germanium buried layer has a thickness ranging from about 1 μm to about 10 μm , and wherein the doped substrate, co-doped germanium buried layer, and the doped epitaxial layer collectively have a thickness ranging from about 2 μm to about 20 μm . Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ

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237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

8. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw ('051) in view of Ramdani et al. (U.S. 7,067,856 B2).

Liaw (Fig.1) teaches a semiconductor device including a doped buried layer (11) located over a doped substrate (10), said buried layer (11) doped throughout with germanium and boron; and a doped epitaxial layer (14) located over said buried layer (11), wherein said semiconductor device can be applied to CMOS and BCMOS (Liaw, column 3, line 50 – column 4, line 68).

Liaw ~~et al.~~ et al. fail to disclose wherein said MOS device further includes interconnects located within interlevel dielectric layers located over transistors, which connect the transistors to form an operational integrated circuit and additional active and passive devices.

However, it is well-known in the art directed to MOS devices ^{for} ~~that~~ these devices ^{to} further include interconnects and other active and passive devices located within interlevel dielectric layers located over the transistors, which connect the transistors to form an operational integrated circuit. Further support can be in Ramdani et al. (Figs.7-11 and column 13, line 38 – column 16, line 21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the device of

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Liaw would also include the claimed limitations as supported by the teachings of
^
Ramdani et al.

as is well known or

Response to Arguments

9. Applicant's arguments with respect to claims 21, 23-27 and 37-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (<http://portal.uspto.gov/external/portal/pair>) which provides applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.



Julio J. Maldonado
August 18, 2006

Julio J. Maldonado
Patent Examiner
Art Unit 2823



GEORGE R. FOURSON
PRIMARY EXAMINER